

Space News Roundup

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National Aeronautics and Space Administration

Challenger nearly ready for rollout

What was once a high fidelity test article is now nearing completion as a spaceworthy orbiter, and could be accepted by NASA in the same week that *Columbia* is launched on STS-4 if schedules hold.

Orbital Vehicle 099, *Challenger*, is now in post checkout operations at Rockwell International's Palmdale, Calif. plant, and is scheduled for rollout sometime in late June. Launch of OV 102, *Columbia*, on STS-4 is now tentatively scheduled for the target date of June 27.

Challenger will undergo final configuration inspection just prior to rollout at Palmdale, when NASA will take acceptance of the vehicle. Final systems installation will take place at the Orbiter Processing Facility at the Kennedy Space Center.

Among the items to be installed at KSC are the Space Shuttle Main Engines and the Orbital Maneuvering System/Reaction Control Pods which mount on either side of the vertical stabilizer. Nearly all of *Challenger's* 30,000 thermal protection system tiles will be installed before rollout, and all of them will be densified for greater bonding strength.

First flight of *Challenger* is scheduled for STS-6 in January 1983.

"It is significant to realize that 099 is actually a converted test article," said Manufacturing and Test Office Manager Wayne E. Koons. "The original layout was to number the vehicles 101, 102, 103 and so on. We also planned to number the test articles from 099 down. Test article 098, for instance, is a complete aft fuselage for propulsion and control systems tests."

Koons said 099 was initially built as a complete structural unit, minus the pressurized crew compartment. It was intended to be tested to failure for data on structural integrity.

"Then somebody realized that if we limited the tests on 099 — if we did not test to failure — then we might be able to complete it," Koons said. NASA decided to do just that about five years ago, at a savings of around \$200 million, he said.

In October 1979 the testing series was completed on 099, and in November and December of that year conversion began to turn it into a spaceworthy orbiter. While 099 testing and conversion was

(Continued on page 2)



Looking more and more like a spacecraft every day, Orbiter 099, *Challenger*, nears completion at Rockwell International's Palmdale, Calif. plant. Final assembly is on schedule for a late June rollout.

Columbia stacking set for next week

The Space Shuttle *Columbia* was scheduled for rollout from the Orbiter Processing Facility to the Vehicle Assembly Building this week as work crews at the Kennedy Space Center continue preparations for STS-4.

Problems with a check valve on the No. 1 Shuttle main engine

caused rollout to be slipped from Monday to sometime today at the earliest.

Technicians unsuccessfully tried to weld back in place the check valve for the main engine's gaseous oxygen system over the weekend. The valve had been removed for testing, and x-rays

show the weld procedure to return it to position were unsuccessful. After it failed x-ray tests, the valve had to be cut out of the line. Technicians were scheduled to put the line back in sometime Monday at *Roundup* press time. Results of that effort were expected later in the day and caused postponement

of rollout until sometime today at the earliest.

Otherwise, the Kennedy Space Center reported all was going well. The tile cavity count on the vehicle was down to 19 on Monday, after some 1,042 tiles were removed for repair or densification.

Also over the weekend, functional checks of the twin orbital maneuvering system engines were completed with no problems, and the main engine No. 1 yaw actuator was successfully replaced and retested.

The payload bay doors were

(Continued on page 4)

Houston Section receives AIAA award

The Houston Section of the American Institute of Aeronautics and Astronautics has for the third straight year been named to

receive the AIAA's Outstanding Section Award.

This comes as the section prepares for a champagne reception

and program Friday honoring the AIAA's 50th anniversary celebration. The reception begins at 7 p.m. May 21 in the Olin E. Teague

Visitor Center at JSC, with a program honoring the achievements "of the Aerospace Pioneers of the Johnson Space Center and the Houston Section" beginning at 8 p.m.

The national award will be accepted on behalf of the Houston group by former Section Chairman Norman H. Chaffee at the AIAA's Annual Meeting and Technical Display in Baltimore later this month.

The Houston Section has received the award four times previously, for the years 1975-76, 1976-77, 1979-80 and 1980-81. It has also received the Special Event Award for 1971-72, 1972-73 and 1979-80.

The AIAA traces its roots to the early 1930s. In April 1930, the American Interplanetary Society, later called the American Rocket Society, was founded. It became one of the two forerunners of what would be the AIAA. The other was the Institute of the Aeronautical Sciences, later called the Institute of the Aerospace Sciences, which was founded in October 1932. In February 1963, the two groups merged to form the AIAA.

During the meeting and technical display in Baltimore, the AIAA's two highest awards, the Reed Aeronautics Award and the Goddard Astronautics Award, will go to John L. McLucas and John F. Yardley, respectively.

McLucas, President of COMSAT World Systems Division, former Secretary of the Air Force and Administrator of the Federal Aviation Administration, is receiving the Reed Award for "contributions and achievements in the development and management of aeronautical systems and for leadership in major U.S. aviation programs." The award is named for Dr. Sylvanus Albert Reed, an aeronautical engineer, designer and founder of the former Institute of Aeronautical Sciences.

Yardley, President of McDonnell Douglas Astronautics Company and former NASA Associate Administrator for Space Transportation Systems, is receiving the AIAA Goddard Award "in recognition of his significant contributions to the development of the Space Shuttle, and its successful and historic first mission." The award is named for rocket pioneer Robert H. Goddard.

The champagne reception at JSC Friday will be hosted by Director Christopher C. Kraft Jr. and Jack Heberlig, Houston Section Chairman. The program will include a history of the flights of *Columbia*, a history of the Manned Spacecraft Center and the Johnson Space Center, and a visual presentation, "Photographic Journey to the Moon," which also will be played throughout the day in the Visitor Center.



This photo montage represents the Houston Section's theme of highlighting the history of the Manned Spacecraft Center and the Johnson Space Center during the AIAA 50th anniversary celebration. The montage shows all aspects of manned spaceflight, from Project Mercury to Project Space Shuttle.

Space News Briefs

Spacelab 1 pallet integration underway

Installation of experiments on the Spacelab 1 pallet began in early May in preparation for the first flight of the reusable scientific laboratory in September 1983. Configuration for the first flight, a joint NASA/European Space Agency venture, will consist of a habitable module in which scientists will work, and a pallet which will support experiments requiring direct exposure to space. The JSC Life Sciences Mini-lab, a double rack of biology experiments, has been transferred from its ground test to its flight rack and has been checked out. Workers are also installing other experiments which will be carried in the laboratory racks inside the habitable module. Once integrated, the racks will be hooked together and slipped into the module as a unit. Besides the JSC Mini-lab, three other racks are presently being integrated. One will contain control and display panels for the Marshall center's pallet-mounted Space Experiments with Particle Accelerators payload, Atmospheric Emission Photometric Imaging and Imaging Spectrometric Observatory hardware. Another rack will hold a data display unit, a video instrumentation recorder, and a Marshall-sponsored package of tribological experiments which will study lubrication in micro-g. The third rack will contain storage compartments.

House deletes Solar Max mission

The House last week passed a \$6.6 billion NASA budget for Fiscal 1983, adding authorization for the Galileo Project and cutting, at least temporarily, the planned repair flight by a Space Shuttle to the Solar Maximum Mission satellite. The House withheld approval for the proposed mission pending a review by NASA and the Air Force. The House passed the spending bill by a vote of 277-84 and sent it to the Senate with \$35 million more than the Reagan Administration had originally requested. Both the Space Shuttle Program and space flight operations were allocated \$1.7 billion each in the measure. The House defeated 204-169 an amendment which would have cut \$35.1 million from NASA aeronautical research.

Oshkosh Fly-In to salute NASA aeronautics

With the theme of "A Salute to NASA Aeronautics," the 1982 Experimental Aircraft Association (EAA) Fly-In at Oshkosh, Wis., July 31 to August 7, will set the stage for an unusual public gathering of the heads of NASA's three aeronautics centers, as well as the NASA Administrator and nine distinguished NASA aeronautical researchers. NASA Administrator James M. Beggs and Associate Administrator for Aeronautics and Space Technology Dr. Jack L. Kerrebrock will participate in convention activities along with NASA aeronautics center directors Dr. Donald P. Hearsh of Langley, Andrew J. Stofan of Lewis and C.A. Syverston of Ames. Nine distinguished aeronautical researchers from the three centers will also be honored by the EAA, and a series of technical papers will be presented at various convention forums by researchers from the three centers. The Oshkosh Fly-In, one of the most widely-attended aviation events in the country, annually turns the normally placid Oshkosh airport into one of the world's busiest during late summer.

Shuttle to carry Boy Scout experiments

TRW Electronics and Defense Sector of Redondo Beach, Calif. has donated a Getaway Special Shuttle payload to the Explorer Movement of the Boy Scouts of America for a future flight. The Joint TRW-Boy Scout project, known as POSTAR, is designed to involve Explorer Scouts in scientific experiments in space. Eighteen Explorer posts have submitted experiment proposals to TRW's Experiment Selection Committee, which is headed by former astronaut James A. Lovell. A decision on which experiment will fly is expected to be announced at the launch of STS-4. Proposed experiments include a study of the physics of expanding gases, crystal formation in a gelatin and capillary pumping in a weightless environment. NASA has so far accepted 326 Getaway Specials for Shuttle flights beginning with STS-4 in late June.

STS-4 news conferences scheduled

News conferences with the STS-4 astronauts, lead flight director and science/payload officials will be held Thursday and Friday, May 20 and 21 in the Bldg. 2 News Center. The Thursday session will include a discussion of the STS-4 flight plan by lead flight director Charles R. Lewis, a science briefing, an explanation of the STS-4 Getaway Special and student experiments and a discussion of public affairs guidelines for the first Department of Defense payload, DoD 82-1. On May 21, STS-4 prime crew Commander Thomas K. Mattingly and Pilot Henry W. Hartsfield will meet the press in a news conference at 9 a.m. in the Bldg. 2 auditorium.

Challenger

(Continued from page 1)

going on, OV 101, *Enterprise*, successfully completed the three-phased Approach and Landing Tests, and OV 102, *Columbia*, was built and delivered to NASA.

Enterprise was the first completed orbiter, although it did not have propulsion systems or payload accommodation capability. *Enterprise* was designed and built for atmospheric testing only and is not considered spaceworthy, although NASA Headquarters has asked JSC to study the merits of extensive modifications to turn it into a fully capable orbiter. That study is now underway.

Challenger will differ from *Columbia* in several important respects, although it still will be very similar. The spacecraft will be configured for operations from the start, whereas *Columbia* will undergo major modifications after STS-5 to convert it from test flight to operational form.

A major difference will be more room in the flight deck and mid-deck areas, and the installation of a heads up display (HUD) on *Challenger's* 'dashboard.' The HUD projects primary flight reference information onto a forward window, so crewmembers can see such readings as speed, altitude, attitude and the ground track without having to look back and forth between instruments and the window. The HUD will also project a computer-generated view of the runway which will coincide with what the astronaut is actually seeing out the window.

Standard Shuttle crew seats have been installed on *Challenger* which allow for much more room on the flight deck. *Columbia* currently has two standard Air Force ejection seats which take up a great deal more space.

Challenger also will have more room in the middeck area with space for a galley and bunks. Much of that space is now taken up on *Columbia* with the large Developmental Flight Instrumentation console.

099 has a lighter and simplified wing leading edge subsystem — the mounting brackets or spar fittings — for some 46 reinforced carbon carbon panels which make up the wing leading edges. That is expected to accomplish an overall weight savings of about 500 pounds, according to Tom Grace, Manufacturing Project Engineer for 099.

Also different is the design of the "doghouse" area on the aft fuselage. That is the structure into which the main engines are mounted. Koons said the primarily

titanium and aluminum structure has been redesigned for further weight savings.

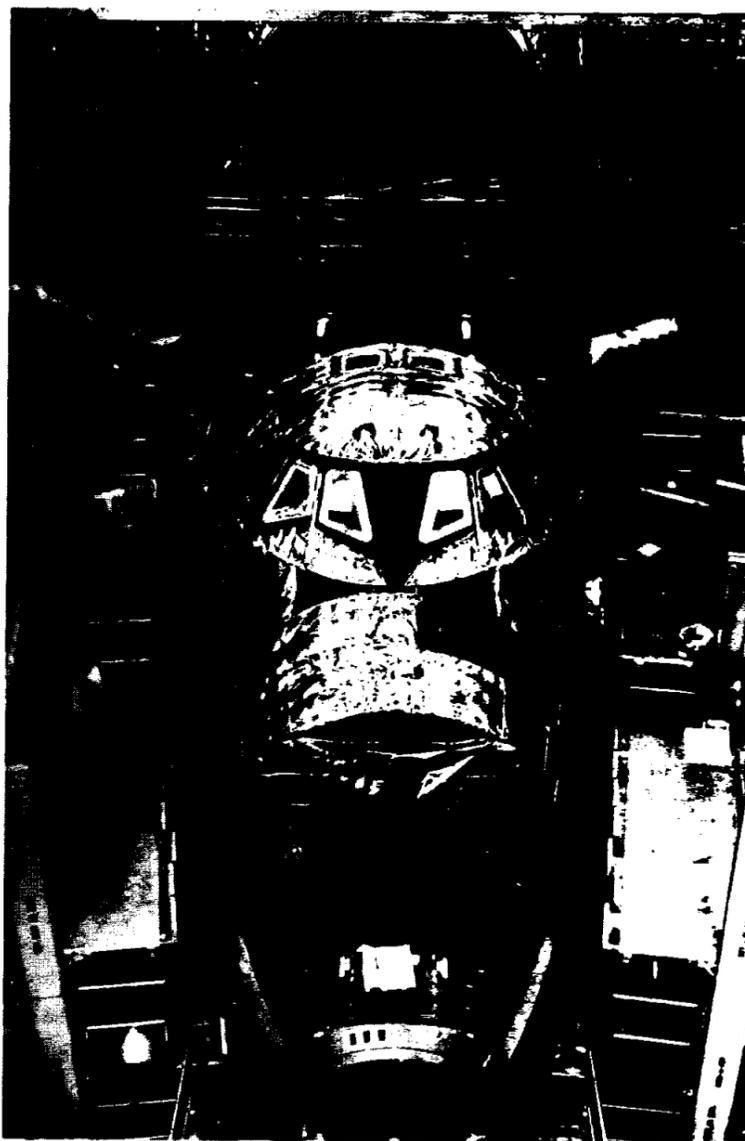
Another area of weight savings is in the structure of the pressurized crew module, he said. The expected inert weight of *Challenger* will be about 172,000 pounds, while *Columbia's* inert weight for STS-3 was 171,996 pounds, according to Ray Hischke, orbiter Mass Properties Project Engineer.

That slightly heavier weight, even with substantial weight savings in some areas, is accounted for by *Challenger's* stronger structural integrity. The vehicle will be capable of withstanding entry maneuvers of 2.5 g's and a vertical velocity at touchdown of eight feet per second. *Columbia* is certified for 2 g maneuvers and six feet per second vertical velocity at touchdown.

After rollout, 099 will be

transported overland on the 36-mile journey from Palmdale to the Dryden Flight Research Facility at Edwards Air Force Base. The trip is expected to take the better part of a day. "We've got some tight spots, especially in Lancaster, Calif., so it will take awhile," a Rockwell spokesman said.

Reflecting on the significance of adding *Challenger* to the Shuttle fleet, JSC Historian Ed Ezel said, "this is the first time NASA has had a second reusable spacecraft. Each spacecraft in the past was expendable, tailored to a single mission. Comparing those earlier vehicles to the Space Shuttle is like comparing the Spirit of St. Louis to the 747. The former was used once, designed for a single specific mission, while the latter is used over and over for a variety of tasks. Adding *Challenger* to the fleet is a very significant event."



099 late last year before installation of the upper forward fuselage.

People and Places

W. Mitchell Brown, a cooperative education student in the Booster Systems Section, received three high honors in two days from Texas A & M University and American Educational Services. On May 4, he was named to the Phi Kappa Phi Honor Society at A & M, and on the same day was selected as one of the 35 students across the country to receive a 1982 American College Scholarship Award. The next day, the Dean of the College of Engineering at A & M formally named him as one of five from the college to receive the Thomas S. Gathright Academic Excellence Award. Brown, a sophomore at A & M, is on his second co-op work tour at JSC and has a perfect 4.0 average.

One third of the J. Robb Associates personnel working in the Project Engineering Branch of the Integration Division have been honored by the Astronaut Office with a 'Silver Snoopy' award. **Pat Kerr**, supervisor, and **Monica R. Hughes**, lead quality assurance inspector, were given the Silver Snoopys for their professional excellence in helping maintaining the quality of all items used by crews on Space Shuttle missions. Six J. Robb Associates personnel work with NASA in provisioning Shuttles with everything

from food to medicine to cameras, film, calculators and tools. Besides assuring that these items are in working order, they brief astronauts on how they are stowed and where they are found. Other J. Robb folks are Joyce Lange, quality assurance inspector; Susan Lab, bond room attendant; Al McAfee, stowage technician; and Chris Fredericksen, stowage technician. The Silver Snoopy is the astronauts' personal award for professional excellence.

The note accompanying the flowers said, "Dear NASA—We were saddened by the death of the honey bees. Please accept our memorial for those who so bravely gave their lives so that we can now know honey will never be made in space." The note was signed by the employees of Zachry's, a florist company headquartered in Marshall with two outlets in Houston. According to **Jane Tabb**, the person at Zachry's who organized the memorial, the employees were genuinely sorry to hear that some of the honey bees aboard the STS-3 insect motion study, the so-called "bug box," had passed on to the hereafter by the time *Columbia* rolled to a stop at White Sands Missile Range March 30. But according to **Mel Coplin** of JSC, the beekeeper who supplied the ex-

periment, honey production in space is most decidedly not an impossibility. A problem in the food dispenser, not the effects of space flight, is now thought to have been the cause of the bee's demise. Several of the insects are now being studied at the U.S. Department of Agriculture's Bee Laboratory in Beltsville, Maryland. Coplin said there is a great deal of interest in the scientific community over the idea of sending a queen, drones and workers up along with a slice of bee hive to see how they would react to micro-g. "They make perfect hexagonal cones down here," Coplin said, "and we'd like to see what they do with that in space."

Of the more than 500 high school students gathered in Houston last week from all 50 states, Puerto Rico and seven foreign nations for the 33rd International Science and Engineering Fair, eight were selected as winners in a competition sponsored by NASA to award their scientific creativity. The winners, along with their teachers, will be flown to Florida for the launch of STS-4, expenses paid. The winners were: **Shari-Lynn Umlas**, North Miami Beach, Fla.; **Dagmar Taborsky**, Palmetto, Fla.; **Lana Marie Hagel**, Birmingham, Ala.; **Tony Phillips**, Niceville, Fla.; **Jess M. Olivieri**, Albu-

querque, N.M.; **Kyle Harold Holland**, Stuart Iowa; **Jerry DuBois III**, Des Moines, Iowa; and **Martin E. Shipley**, Los Alamos, N.M. NASA also named ten honorable mention winners, each of whom will receive photos of Shuttle launch and landings with astronaut autographs.

Astronauts **Robert L. Gibson** and **Dr. Rhea Seddon Gibson**, who were married in May 1981, have announced they are expecting the birth of their first child late this summer. The Gibsons, one of two married couples in the astronaut corps, joined NASA in January 1978. They were married in her hometown of Murfreesboro, Tenn.

STS-2 Commander Joe Engle has been temporarily assigned to Headquarters as Deputy Associate Administrator for Manned Spaceflight in conjunction with the recently announced Space Transportation Systems organizational changes. Engle, who will retain his astronaut status, will report to **Maj. Gen. James A. Abrahamson**, USAF, the Associate Administrator for Space Transportation Systems. Engle will be working to help simplify the integration process for Shuttle users and to bring his special qualifications to bear on the various capabilities of

humans in space. Engle will return to JSC in the fall to resume Shuttle flight training.

A ceremony held April 16 in Bldg. 1 honored 30 employees who received their 25, 30, 35 and 40-year length of service certificates. The certificates were presented by JSC Director Christopher C. Kraft Jr. The employees honored, and their length of service, were: Pete Medina, 35 years; Dailey E. Rowe, 40 years; Henry G. Goodwyn, 30 years; Bill R. Robertson, 30 years; Richard J. Gillen, 25 years; Burton M. Gifford, 30 years; Douglas A. LaPoint, 25 years; Paul O. Ferguson, 25 years; Henry W. Fancher, 25 years; John G. Waters, 25 years; Thomas R. McPhillips, 30 years; Byron D. Hines, 25 years; Peter Brown Jr., 35 years; Thomas W. Davis, 30 years; A. Carol Hill, 25 years; Calvin C. Guild, 25 years; Gordon L. House, 25 years; William H. Douglas, 25 years; Joseph A. McKeon, 30 years; Harold H. Hill, 25 years; Meredith W. Hamilton, 25 years; Albert V. Towns, 40 years; Joan D. Landon, 30 years; Charles B. Morman, 25 years; Fred A. McAllister, 25 years; Sarah K. Duncan, 25 years; Jack S. Keggins, 30 years; Joyce A. Priode, 30 years; Pete D. Strahl, 40 years and Bobby J. Miller, 25 years.

Near-Earth asteroid is rendezvous candidate

An asteroid that periodically crosses Earth's orbit was recently discovered when two components of a rare split comet were photographed. The discovery was made by Eleanor Helin, a scientist at NASA's Jet Propulsion Laboratory.

The asteroid is seen as a possible candidate for an asteroid-rendezvous mission under study at JPL.

The newly discovered body, 1982 DB, is a member of a group of Earth-crossing objects called Apollo asteroids. They are maverick asteroids in unique orbits outside the main asteroid belt between Mars and Jupiter.

Asteroids, of which there are thousands, are called minor planets — planetesimals. They may be the remains of a planet that was torn apart by collision or they may represent some of the original debris from which the planets and satellites coalesced. It is possible asteroids are chunks of a planet that never formed.

While near-Earth asteroids are potential hazards to Earth, they are also located close enough to Earth to be utilized for resources in the future.

1982 DB, one of 34 known Apollo asteroids, made its closest approach to Earth in January, when it passed within 4.6 million kilometers (2.9 million miles).

The asteroid also is especially accessible from Earth since it is

nearly in the plane of the ecliptic — the approximate plane of the solar system in which the planets orbit the Sun.

Helin, who, with Dr. Eugene Shoemaker of the U.S. Geological Survey, has conducted a systematic search for asteroids and comets at Palomar Observatory for 10 years, discovered the new asteroid while obtaining a follow-up observation of Comet du Toit-Hartley, which was observed 45 years ago as a single body.

Observations were being made of this comet, which had split since its earlier apparition. Both components of the comet were recorded about one degree apart on a single photographic plate using the 1.2-meter (4-foot) Schmidt telescope at Palomar. In between the two cometary bodies, Helin found the characteristic streak of the "new" asteroid — 1982 DB.

"To obtain an observation of a split comet and this object in that position in the sky is quite extraordinary," Helin said of the discovery.

When the asteroid was found, it displayed retrograde motion in relation to the Earth.

Observations from the Kitt Peak Observatory in Arizona and the Mauna Kea Observatory in Hawaii are underway to determine the possible composition and size of the asteroid, in addition to its rotation rate. Its size could range from less than a mile to several miles in

diameter, Helin said.

The asteroid was determined to be an accessible target for an unmanned asteroid rendezvous mission, replacing the asteroid Anteros as a prime candidate for a possible future mission to explore and sample an asteroid. Asteroids may contain a geologic record of the early solar system and could provide clues to the formation of planets and satellites.

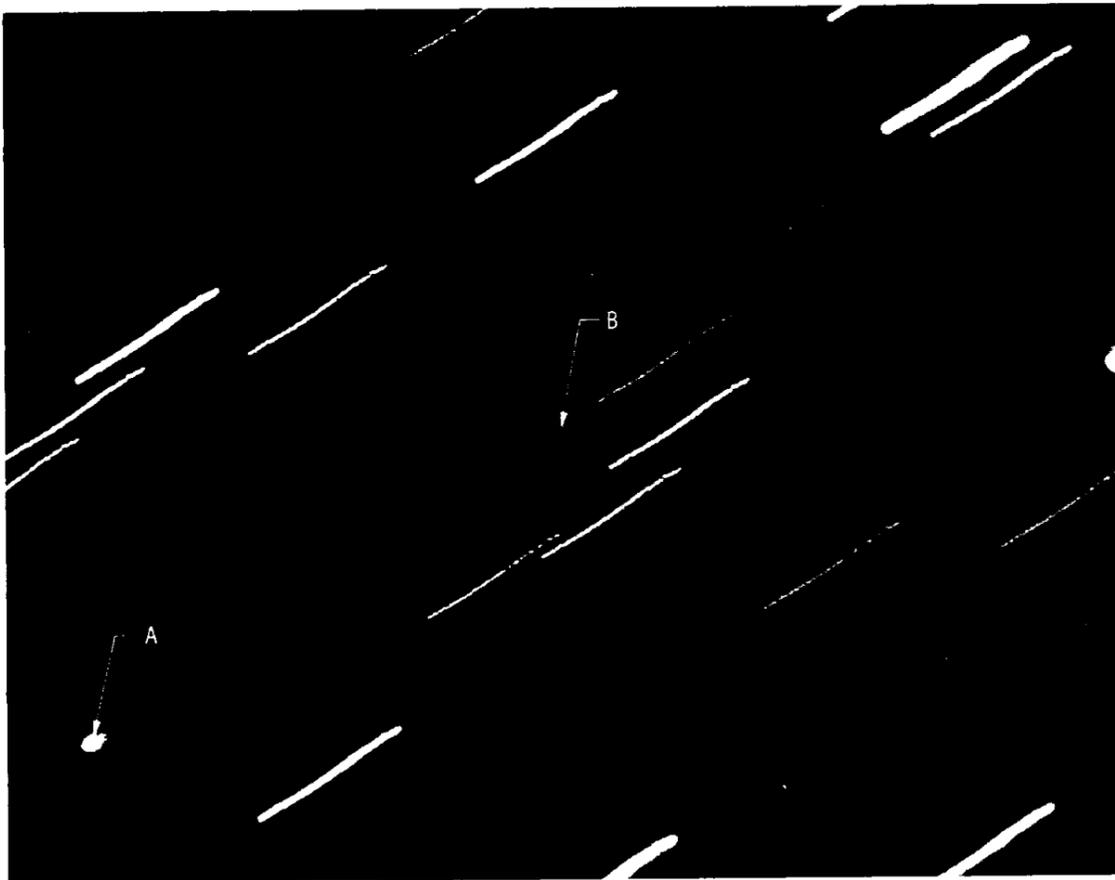
According to mission designers at JPL, 1982 DB could be reached by spacecraft with relatively little energy. The Mariner Mark 2 spacecraft, under study at JPL for low-cost space exploration missions, could be used for such an asteroid rendezvous mission.

Helin initiated a systematic search for Apollo-type asteroids in the early 1970s, in collaboration with Shoemaker.

The search, conducted with the Schmidt telescopes at Mt. Palomar, has yielded many discoveries, including the Apollo asteroid Aten, the first asteroid found to have an orbit smaller than Earth's and a period of revolution about the Sun of less than a year. Other discoveries include unusual asteroids that cross the orbits of Venus, Earth and Mars, and numerous main-belt asteroids. She discovered Comet Helin in the spring of 1977.

Helin's observational work is sponsored by NASA, the California Institute of Technology and private donations.

Near-Earth asteroid 1982 DB, identified by the "B" arrow, center, was discovered in this photograph taken the night of Feb. 27-28 by JPL planetary scientist Eleanor Helin. One of the components of the split Comet du Toit-Hartley, the "A" arrow, is seen at lower left.



Variety of planes to be on hand for Ellington air show Saturday

A British Royal Air Force Avro Vulcan bomber flight demonstration will be among the more unusual features of an air show to be held on "Star Spangled Saturday" during Armed Forces Week at Ellington Air Force Base May 22.

The air show, which also will feature a precision flying demonstration by the U.S. Navy Blue Angels, is open to the public. Events start at 9 a.m. May 22.

Other aerial demonstrations will include a maximum performance takeoff by a Lockheed C-130 cargo plane, a diamond formation flyover by four McDonnell Douglas F-101 Voodoos and a flyover by a McDonnell Douglas F-4 Phantom.

Also on hand will be Coast Guard, Army and Marine Corps helicopters for static displays and some flight demonstrations.

NASA aircraft displays at the air show will include a Northrup T-38 Talon, a Grumman Gulfstream II Shuttle Training Aircraft, a Boeing WB-57F, the KC-135 zero-g training aircraft and the B-377 Super Guppy cargo aircraft.

Other planes displayed on the tarmac are scheduled to include a U.S. Air Force Fairchild A-10, a Navy Grumman F-14, and Air Force McDonnell Douglas F-15, and an Air Force Convair F-106.

NASA, Texas Air National Guard and other displays will also be located in Hangar 594 at Ellington.

The day's events begin at 9 a.m. with the playing of the Star Spangled Banner and a parachute jump by the 82nd Airborne Division All American Jump Team. The tentative schedule also includes:

- an F-101 and F-4 flyover at 9:15 a.m.;
- a C-130 maximum performance takeoff and flight demonstration beginning at 9:30 a.m.;
- A Vulcan bomber flyover at 12:30 p.m.;
- and a Blue Angels precision flying demonstration from 2:30 to 3:30 p.m.

Visitors should enter the main gate at Ellington, and will be directed to parking areas. The displays will close at 4 p.m.

Bulletin Board

STS-4 vehicle passes available

The Public Services Branch, AP4, is currently accepting requests from NASA and contractor employees for vehicle passes for the launch and landing of STS-4. A launch pass will permit the occupants of one standard size passenger vehicle, including vans, to view the launch from either the Causeway or Parkway public viewing site, depending on traffic flow the morning of the launch. All recreational vehicles, campers, trailers and buses will be accommodated at the Parkway site and will require a special placard. No such distinction will be made for the landing at Dryden. When submitting requests, please provide your name, complete mailing address, type of pass requested (launch or landing), and indicate whether your vehicle is standard or oversized. Passes and instructions will be mailed from JSC approximately 30 days prior to launch. For more information, call x4241.

Summer show announced at Burke Baker

"Two Worlds Unknown" will be the featured summer show of the Burke Baker Planetarium from June 4 through August 29. Show times are Monday through Friday at 2 p.m. and 3 p.m., Saturday and Sunday at 2 p.m., 3 p.m., and 4 p.m., and Friday evenings at 8 p.m. Admission is \$2 for adults and \$1 for children under 12. The Burke Baker Planetarium is part of the Houston Museum of Natural Science and is located at 1 Hermann Circle Drive in Hermann Park. The Museum is open from 9 a.m. to 5 p.m. Monday through Saturday, noon to 5 p.m. on Sunday, and 7:30 to 9 p.m. on Friday evenings. There is no admission charge for the Museum.

1982 Savings Bond drive underway

The 1982 U.S. Savings Bond is currently underway at JSC and will run through May 28. Savings Bonds offer an easy way to accumulate savings through payroll deduction (as little as \$3.75 per pay period at a 9 percent rate when held to maturity). Savings bonds also offer some distinct tax advantages to the saver, so consider signing up for the payroll deduction plan or increase your current deduction.

JSC Toastmasters invite participation

The development of communications skills can be an important asset in career growth, and the Spaceland Toastmasters Club at JSC may be one place to learn them. Toastmasters meet every first and third Wednesday at 11:30 a.m. in the Bldg. 3 Cafeteria. For more information, call Ann Sullivan at x2231 or Darrell Boyd at x3431.

JSC Astronomy Brown Bag Seminar

The JSC Astronomy Brown Bag seminar is held each Wednesday from noon to 1 p.m. in conference room 193 of Bldg. 31. The May 19 session is open discussion. On May 26, Steven Croft of the Lunar and Planetary Institute will speak on geologic processes on icy satellites.

MAES to elect officers June 2nd

The monthly luncheon meeting of the Mexican American Engineering Society (MAES) will be held at 11:45 a.m. June 2 at the Loma Linda Restaurant, 810 NASA Road One. Election of officers for 1982-83 will be on the business agenda. All engineers interested in MAES are welcome to attend. Call Ralph Gonzales at x3205 for information or reservations.

Solar technology conference set for June

Houston will be the host for the Solar Technologies Conference and International Exposition June 1 to 5 at the Albert Thomas Convention Center. This premier international solar energy showcase is the largest ever held for solar technologies and products. Major topics of the exposition, the theme of which is "the Renewable Challenge," are international solar energy development, advanced design and technologies, the solar market and solar systems and the utility companies. Specialists will present papers on such topics as photovoltaics, passive and hybrid cooling, wind energy, conversion systems, energy integrated farm systems and the uses of gasahol. The U.S. Department of Commerce Foreign Buyers Program has granted the show international trade fair status, a designation generally reserved for only about 15 of the annual 8,000 trade exhibitions held in the U.S. annually. The exposition is open to conference participants and others on the following dates: June 2, 3 and 4 the exposition is open to business card holders for \$5, and on June 5 it is open to the general public for \$2. Volunteers may attend the conference in exchange for eight hours time. The proceedings plus conference attendance will require 16 hours of volunteer time. To volunteer, call Evan Howell at 966-7055.

May is blood pressure screening month

High blood pressure affects about 60 million people in this country. It is a debilitating condition that increases the risk of strokes, heart attacks and kidney failure. Because there are no symptoms, many people do not realize they have it or, when on prescribed medication for the condition, stop taking the medication because of the absence of symptoms. Have your blood pressure checked today.

JSC Aero Club accepting applications

The JSC Aero Club is now accepting new membership applications for flying at club rates. Members may rent a Cessna 150 for \$20 an hour (wet) or a four-place Piper Archer II with auto-pilot, air conditioning and full IFR panel for \$30 an hour (wet). Member dues are \$25 a month. The planes are based at Houston Gulf Airport in League City. Two club members are certified flight instructors available for beginning lessons or advanced flight instruction. Membership is open to JSC employees and contractors. Experienced pilots are desired, but non-pilots may join and learn to fly. For more information or membership application forms, call J. D. Haptonstall at x5285, Dennis Morrison at x5281 or B. Mercantel at x2314.

NASA
Lyndon B. Johnson Space Center

Space News Roundup



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Editor

Brian Welch

Gilruth Center News

Call x3594 for more information

Country western dance - Learn the latest country and western dance steps as well as the old standbys. Our next 4-week session begins on June 7 with the intermediate class from 7:05 to 9:05 p.m. and beginners from 9:05 to 11:05 p.m. Cost is \$20 per couple and class is limited to 15 couples.

Children's movie - The next children's movie will be "Cinderella". It will be shown on June 12 from 10 a.m. to noon. Cost is \$1 per person. This includes popcorn and cokes. Tickets are on sale at Bldg. 11 Exchange Store.

Predict your own time race - Come sign up for our annual race at the Rec Center. Starting time is 8 a.m. Trophies given to the closest prediction in both the 4-mile and 1-mile race. Ribbons to all participants.

Aerobic dancing - Dance away those extra inches with Jackie Sorensen's aerobic dancing. The 8-week session begins July 12 with classes on Monday and Wednesday from 9 to 10 a.m. and Tuesdays and Thursdays from 4:15 to 5:15 p.m. Cost is \$38.

Men's B and women's softball tourney - To be held at the Gilruth Rec Center on May 21, 22, 23. Cost is \$65 per team. Call x3594 for more details. Trophies to winners in each category.

Dancercise - Part dance, part exercise, all fun. This class begins June 1 for 6 weeks and meets on Tuesdays and Thursdays from 5:30 to 6:30 p.m. Cost is \$20 per person.

Volleyball registration - Volleyball registration is now being accepted from May 4 to May 18. League play begins May 24. Teams will be accepted in men's competitive, women's competitive, men's recreational, women's recreational, and mixed competitive and recreational. Limit is 11 teams per league, first come-first serve.

Beginning watercolor - Learn the basics of watercolor in this 4-week course that begins on May 19. Class meets from 7:15 to 9:15 p.m. and cost is \$25. For more information call x3594.

Delta Downs - Anyone interested in an overnight package call x3594. If anyone is interested in a tour to The World's Fair call x3594.

Defensive driving - Cost is \$18 and will be held on June 12 from 8 a.m. to 5 p.m. Class size is limited.

Cookin' in the Cafeteria

Week of May 17 - 21, 1982

Week of May 24 - 28, 1982

Monday: French Onion Soup; BBQ Sliced Beef, Parmesan Steak, Spare Rib w/Kraut, Chili & Macaroni (Special); Ranch Style Beans, English Peas, Mustard Greens. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Split Pea Soup; Meatballs & Spaghetti, Liver & Onions, Baked Ham w/Sauce, Corned Beef Hash (Special); Buttered Cabbage, Cream Style Corn, Whipped Potatoes.

Wednesday: Seafood Gumbo; Cheese Enchiladas, Roast Pork w/Dressing, BBQ Link (Special); Pinto Beans, Spanish Rice, Turnip Greens.

Thursday: Beef & Barley Soup; Roast Beef w/Dressing, Fried Perch, Lasagne w/Meat, Chopped Sirloin, Chicken Fried Steak (Special) Whipped Potatoes, Peas & Carrots, Buttered Squash.

Friday: Seafood Gumbo; Fried Shrimp, Baked Fish, Beef Stroganoff, Fried Chicken (Special); Okra & Tomatoes, Buttered Broccoli, Carrots in Cream Sauce.

Monday: Cream of Potato Soup; Franks & Sauerkraut, Stuffed Pork Chop, Potato Baked Chicken, Meat Sauce & Spaghetti (Special); French Beans, Buttered Squash, Buttered Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Navy Bean Soup, Beef Stew, Liver & Onions, Shrimp Creole, Smothered Steak w/Dressing (Special); Corn, Rice, Cabbage, Peas.

Wednesday: Seafood Gumbo; Roast Beef, Baked Perch, Chicken Pan Pie, Salmon Croquette (Special); Mustard Greens, Italian Green Beans, Sliced Beets.

Thursday: Beef & Barley Soup; Beef Tacos, Diced Ham w/Lima Beans, Stuffed Cabbage (Special); Ranch Style Beans, Brussels Sprouts, Cream Style Corn.

Friday: Seafood Gumbo; Fried Shrimp, Deviled Crabs, Ham Steak, Salisbury Steak (Special); Buttered Carrots, Green Beans, June Peas.

Columbia

(Continued from page 1)

closed in preparation for the rollout, and a fill and bleed of the orbiter's hydraulic system was also finished. Other tasks completed included servicing of the orbiter's ammonia boilers and water spray boilers.

Nine reaction control system thrusters—some of them contaminated by gypsum dust from White Sands—had to be removed and replaced, according to Director of Shuttle Processing Alfred O'Hara. There are 38 of these 840 lb. thrusters aboard the spacecraft, he said.

If the current rollout schedule holds, *Columbia* will have been in the OPF for 42 days, compared with 53 for STS-3 and 99 for STS-2.

O'Hara said rollout from the VAB will come no earlier than May 25. Mating preparations on the twin solid rocket boosters and the external tank have been completed, he said, and the assembly is ready to accept *Columbia*.

A dry countdown demonstration is scheduled for late May at the pad, and installation of the Department of Defense payload, also at the pad, is scheduled for the first week in June.

O'Hara also reported that *Columbia's* toilet, which did not function at peak efficiency during STS-3, was removed, repaired and has been reinstalled.

STS-4 is a planned seven day flight at an altitude of 160 nautical miles with an inclination to the equator of 28.5 degrees. The solid rocket boosters will have standard casings, with staging at 27 nautical miles altitude and 20 nautical miles downrange, for an impact in the Atlantic Ocean 125 nautical miles downrange. STS-4 will fly with a standard heavyweight external tank, with

main engine cutoff at 55 nautical miles in altitude, 720 nautical miles downrange, with separation from the orbiter 18 seconds later.

Crew members Commander Thomas K. Mattingly and Pilot

Henry Harsfield are scheduled to use *Columbia's* automatic flight system from entry interface to touchdown except for aerodynamic tests during their atmospheric return.



The latest Spaceweek poster was unveiled last week, and is now being printed for the July 16-24 observance across the country. Pat Rawlings, an exhibit designer for Omniplan at JSC, incorporated a number of different aspects of space exploration into the full-color poster. Galileo, inventor of the telescope and discoverer of the four primary moons of Jupiter, is shown at lower right peering into the heavens, while just above him Voyager II makes its own space observations. At center, a Space Shuttle rises out of a cloud bank against the backdrop of Jupiter, Saturn and Uranus, while at lower left, several pioneers of space exploration look on. Among them is Wernher von Braun, Robert Goddard and Hermann Oberth. The poster should be on sale at the Bldg. 11 Exchange Store by late May or early June.

Plume technology conference held

More than 130 people attended the joint Army, Navy, NASA, Air Force (JANNAF) Thirteenth Plume Technology meeting April 27 to 29 at JSC.

Purpose of the JANNAF meeting was to present the latest advancements in rocket engine exhaust plume technology to the technical community. The meeting was attended by representatives from the various NASA field centers, the Air Force Systems Com-

mand Laboratories, Army Missile Command Laboratories and Naval weapons centers. Fifty three technical papers were presented in several workshops.

The meeting agenda covered topics ranging from sophisticated computational methods to flight data reports. Two sessions on plume signature and visibility covered the analysis and measurement of the electromagnetic radiation and smoke pro-

duced in rocket exhausts.

The meeting also had two sessions covering solid rocket motor ignition overpressure. The overpressure problem and techniques to reduce it are new areas of interest to the JANNAF, in that they involve considerations necessary for the Space Shuttle. In addition to the formal presentations, workshops were held on the subjects of flow fields, visibility and overpressure.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property and Rentals

For rent: Galveston West Beach, three bedroom, A/C, Gulf side, \$250/week. 481-5943.

For rent: Hawaii Condo. 1 bedroom waterfront, Makaha area of Oahu. \$175/week. 481-5943.

For rent: Galveston West beach, 2 bedroom, A/C, Gulf side, \$150/week. 481-5943.

Veterans, assume 13% VA loan, Clear Lake, 3-2-2, on golf course, \$35k, call Nick, x3695 or 480-2500.

Lease: El Dorado Trace Condo, split two bedrooms, two baths, fireplace, refrig., washer/dryer, burglar alarm, \$545 plus electric & deposit. Available June 1. John x5301 or 482-8457.

1973 Glenbrook, 14 x 56 fully carpeted, 2-1 1/2, central air and heat, set up in nice park. \$9,000 cash. Call 482-2630.

Lot for sale. Lake Water Wheels, Shepard, TX. 1 hr. from Houston. Swim, hunt, fish, camp. Family Fun. Call 489-0472 after 5 p.m.

Lease: Condo. 1-1-2. Fireplace, all appliances, two swimming pools, nearly new (1 yr.), on water, very close to JSC. Actkinson. 333-3256.

Cars and Trucks

1976 Nova. Auto, PS, PB, AM-FM, Air, Tint, Tilt wheel, cruise, 4 dr., runs good. \$1200 or best, ext. 5053 or 489-7494.

1973 Plymouth Satellite, 318, loaded, runs good, \$1400 or best offer. Call 332-1019, evenings, Sat., or Sun.

1976 Datsun 280Z 2+2, air turbine mags, new tires, AM/FM, runs great, \$4,500 neg. Call Mike, 483-4231 or 480-2222 after 6 p.m.

1973 Plymouth Satellite, V-8, 2 door, auto, air, PS, PB, 1 owner \$1000. Call 554-7306.

Wrecked my 1973 Toyota Corolla. Sell parts cheap, including rebuilt engine, A/C, radio, tires, wheels, new brake shoes, etc. 946-6814.

1974 Opel Wagon, automatic transmission, two new and three good tires, 113,000 miles. Call Guess after 6 p.m. 649-5092.

'74 Volkswagen "Thing", less than 12,000 mi., all original, excellent condition. Best offer over \$4,000, firm. Call Dave x2631 or 482-5218 evenings.

Cycles

1977 KZ-1000 New Trans, rebuilt engine, custom painted tank, side cover & fender. Turns 10.92 to 11.02 quarter mile. Street legal. \$1500 cash. Call Richard 332-3211 after 4 p.m.

1974 Honda CB 360 G with windshield \$600 call Skip Guidry x7484 or 334-3425.

1979 Honda Twinstar, 8,500 miles, 185 cc., good commuter bike, 70 mpg, \$895. Call Steve, x5111 or 554-2435.

Computers

Texas Instruments programmable 59 calculator, print/security cradle, 2 solid-state software modules, extra magnetic cards, printer paper, carrying case, manuals. Excellent condition, all for \$325. Call Mark Cintala, x5191.

Boats & Planes

For Sale: 16' fiberglass canoe, exc. condition, no patches, \$220. Also, 1.2 HP outboard motor & canoe motor bracket \$110. Morris, x5293, or 481-3900.

1980 Searay Mod. 192 SRV 165 hp I/O; exc. cond., low hrs. \$8200. R. Wilson x2766; 488-4139 or 488-6266 after 5.

17' Glastron Motor Boat with V-Hull, brown/cream color, 115 HP Johnson Outboard Motor with Tilt Control Switch, trailer. Excellent condition. \$6,000.00 Ed Barker 280-0976.

Easy Riser Bi-Wing hang glider, 12 hp McCulloch 101, tricycle landing gear, seat & harness, A.S.I., 200 lbs capacity, \$1,000. 481-8731.

FAA approved Pilot Ground School in May \$10. Instructors/Planes at low rates. Gulf Coast Aero Club. Mark, x4436, 480-2634.



People Helping People The United Way

For sale: Dinghy, 8 ft. with 2.5 hp Johnson, double hull, plastic. 27-ft. Catalina sailboat, 30-hp Atomic gear, wheel. Bernhard, 333-2968.

Grumman Tiger for rent. 155 mph cruise at 17 mpg. \$37/hr wet. Clover Field. 482-1228.

Household

Zenith 24" color console, \$100, lawn mower, Eager 1 with bag, \$75, both in good condition, Beverly x2593 or 997-1131.

Sofa sleeper, Herculon, good cond. \$150.00 Trestle table, 4 chairs, pine. 486-1089.

Maytag washer, 10 yr. old, good condition except needs new motor, \$25 or best offer. Call 554-7306.

Antiques — table, chairs, cabinets, rocking chairs, stained glass and more Call 334-4483.

Musical

For Sale: Flute, Gemeinhardt, M2, Solid Silver Head 488-8143.

Octave Cat-SRM electronic Synthesizer, must sell. \$700. James, 332-8837.

Wanted

Bird cage, about 2 cubic feet volume, Call Konradi, x2956 or 334-2180.

Male seeking roommate to share Webster 2 BR, available June 1, \$170/mo. bills paid, plus \$100 deposit. Call Welch, x5111 or 554-6742, evenings.

Kodak Carousel slide projector. Call Bob Allgeier at 488-0397 after 6 p.m.

Pets

Labrador pups, AKC, yellow, whelped 3-9-82, parents on premises. Both good hunters. Hips guaranteed. Call after 6 p.m. weekdays, anytime weekends, 534-2488.

Miscellaneous

2 HP Radial arm saw, Dealt by Black & Decker w/stand \$200. Used once, call after 4 p.m., Richard 332-3211.

Used swing set with slide. Needs paint. You haul off for free; 1/4 cord seasoned firewood, \$25. Call Jack x5543.

Life time membership to a 97-acre resort on Lake Conroe, \$1,500 cash. Take over payment \$36.32 mo. Richard, after 4 p.m., 332-3211.

1977 24' Rockwood Travel Trailer. AC, central heat, fully self contained. Very clean. Excellent condition. Call Jim x2375 or 488-0658 after 5 p.m.

Fly International Pan Am 2 for 1 coupons until May 31. \$50. Doris Wood x4465 or 333-2373 evenings.

Model 33 teletype w/papertape option, \$125. Call Jerry Redman, 721-0259 after 6 p.m.

Spalding Epic golfclubs, three woods, eight irons, and putter, \$50. Call 483-4981, Brent.

Assorted U.S. commemorative stamps, 3 cent to 18 cent values. No more than 10 of ea., \$25. Call Jeff, x7429 or 482-5393.

For sale: home built motorcycle trailer. Holds two cycles, needs wheels and tires, \$50. Call Williams, 476-7563, day or 559-2697 night.